STATUS OF THE CLAIMS

Claims 1-29 were originally filed in this patent application. In response to the first office action dated 10/30/2006, an amendment was filed on 01/12/2007 that cancelled claims 1-4, 9-13, 16-21, 23-24 and 27-28 and amended claims 5, 7, 14-15, 22 and 26. In the pending office action dated 03/30/2007, claims 5, 7, 14, 22, and 26 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,513,028 to Lee *et al.* (hereinafter "Lee") in view of U.S. Patent Application Publication 2005/0097084 to Balmin *et al.* (hereinafter "Balmin") and further in view of U.S. Patent Application Publication 2004/0225639 to Jakobsson *et al.* (hereinafter "Jakobsson"). Claims 6, 8, 15, 25 and 29 were rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of Lee, Balmin, Jakobsson and U.S. Patent Application Publication 2004/0122845 to Lohman *et al.* (hereinafter "Lohman"). No claim was allowed. In this amendment claims 6, 8, 15, 25 and 29 have been cancelled, and claims 5, 7, 14, 22, and 26 have been amended. Claims 5, 7, 14, 22, and 26 are currently pending.

REMARKS

Rejection of claims 5, 7, 14, 22 and 26 under 35 U.S.C. §103(a)

The examiner rejected claims 5, 7, 14, 22 and 26 under 35 U.S.C. §103(a) as being unpatentable over Lee in view of Balmin and Jakobsson. Applicants have amended claims 5, 7, 14, 22 and 26 and cancelled claims 6, 8, 15, 25 and 29 from further consideration in this application. Applicants are not conceding in this application that the cancelled claims are not patentable over the art cited by the examiner, as the present claim amendments and cancellations are only for facilitating expeditious prosecution of the remaining claims in this patent application. Applicants respectfully reserve the right to pursue the cancelled and other claims in one or more continuations and/or divisional patent applications.

Claim 5

In the rejection, the examiner states that Lee teaches "the query optimizer, for each additional key in the sub-optimal index, reads statistical information regarding the additional key", citing col. 6 lines 14-19, 42-47 et seq. of Lee. The claim has been amended to recite a frequent values list to be more descriptive of what statistical information is being used. This amendment overcomes the examiner's mapping of Lee on the "statistical information" that was previously in claim 5. Nowhere does Lee teach or suggest reading a frequent values list that corresponds to an additional key in a sub-optimal index. Lee does teach a way to provide values for missing key columns in an index. However, Lee does not teach or suggest reading a frequent values list that corresponds to the additional key, as recited in claim 5. For this reason, claim 5 is allowable over the combination of Lee, Balmin and Jakobsson.

In the rejection of claim 5, the examiner admits that Lee does not explicitly disclose "rewriting the query using the statistical information in a manner that allows

probing the sub-optimal index according to the rewritten query". The examiner then states that Balmin discloses this limitation, citing para. 17 et seq. of Balmin. Applicants respectfully assert that the query rewriting taught in Balmin does not read on this limitation in claim 5.

Rewriting of queries to enhance their performance is well-known in the art. Balmin is an example of the prior art. Balmin "detects all structures applicable to the query and rewrites the query to use such structures, speeding up the performance of the queries." Balmin Abstract. In claim 5, the query optimizer rewrites the query using a frequent values list regarding the additional key. Balmin does not teach rewriting a query using a frequent values list that corresponds to the additional key. In addition, claim 5 recites "the query optimizer rewriting the query using the frequent values list in a manner that allows probing the sub-optimal index according to the rewritten query." The query rewriting in Balmin is done to improve execution time for the query. The query rewriting in claim 5 is done in a manner that allows probing the sub-optimal index according to the rewritten query. The queries in Balmin are not rewritten in a manner that allows probing a sub-optimal index according to the rewritten query. For these reasons, Balmin does not teach or suggest "the query optimizer rewriting the query using the frequent values list in a manner that allows probing the sub-optimal index according to the rewritten query" as expressly recited in the amended claim 5.

In the rejection of claim 5, the examiner also admits Lee does not explicitly disclose "determining from the sub-optimal index an estimated number of rows in the database table that satisfy the query and optimizing the query based on the estimated number of rows in the database table that satisfy the query", then cites to Jakobsson as allegedly teaching these limitations at para. 10 lines 10-16 et seq. The cited portion of Jakobsson teaches table statistics that are persistently stored and used to estimate costs of alternative execution plans for a query. Jakobsson states at para. 10 lines 9-16:

> Examples of table statistics include table cardinalities (the number of rows in a table), the number of distinct values for a column, the minimum and maximum value in the column, and histograms, which is data that specifies the distribution of values in the columns, i.e., the number of rows that have particular column values for a column or the number of rows that have a column value that falls within a range.

These table statistics do not include an estimated number of rows in the table that satisfy a query, as recited in claim 5. The table statistics in Jakobsson may be used to estimate costs of alternative execution plans for a query. However, the table statistics in Jakobsson are not determined by a query optimizer. They are used by the query optimizer to estimate cost of an execution plan for a query. Furthermore, the table statistics in Jakobsson are not determined by the query optimizer from a sub-optimal index, as recited in claim 5. Finally, the table statistics in Jakobsson do not read on an estimated number of rows in the database table that satisfy the query as recited in claim 5.

The examiner's rejection of claim 6 needs to be addressed because the limitations of former claim 6 have been added to claim 5 in this amendment. In rejecting claim 6, the examiner states that Lohman teaches a frequent values list, and states it would have been obvious to a person of ordinary skill in the data processing art to combine Lee, Balmin and Jakobsson with Lohman "because Lohman's use of frequent value list would have enabled Lee, Balmin and Jakobsson's overall system to estimate query cost, and also automate the process of candidate selection." This rationale for the combination is defective because Lohman's use of a frequent values list is not needed in the combination of Lee, Balmin and Jakobsson to estimate query cost. To the contrary, Jakobsson already teaches table statistics that are persistently stored and used to estimate costs of alternative execution plans for a query, so Lohman is not needed to enable the combination of Lee, Balmin and Jakobsson to estimate query cost, as stated by the examiner. Furthermore, the examiner's language "and also automate the process of candidate selection" is not a valid rationale for combining Lohman with Lee, Balmin and Jakobsson because using the frequent values list in Lohman has nothing whatsoever to do with automating the process of candidate selection. For the reasons given above, the examiner's rationale for

combining Lee, Balmin, Jakobsson and Lohman is in error. None of the cited art nor their combination teach or suggest all of the limitations in claim 5. As a result, claim 5 is allowable over the combination of Lee, Balmin, Jakobsson and Lohman.

Claims 7, 14, 22 and 26

Claim 7, 14, 22 and 26 include many of the limitations discussed in claim 5 above, and are therefore allowable for the same reasons.

Rejection of claims 6, 8, 15, 25 and 29 under 35 U.S.C. §103(a)

The examiner rejected claims 6, 8, 15, 25 and 29 under 35 U.S.C. §103(a) as being unpatentable over the combination of Lee, Balmin, Jakobsson and Lohman. Claims 6, 8, 15, 25, and 29 have been cancelled herein, and therefore need not be addressed.

Conclusion

In summary, none of the cited prior art, either alone or in combination, teach, support, or suggest the unique combination of features in applicants' claims presently on file. Therefore, applicants respectfully assert that all of applicants' claims are allowable. Such allowance at an early date is respectfully requested. The Examiner is invited to telephone the undersigned if this would in any way advance the prosecution of this case.

Respectfully submitted,

By /derekpmartin/
Derek P. Martin
Reg. No. 36,595

MARTIN & ASSOCIATES, L.L.C.
P.O. Box 548
Carthage, MO 64836-0548
(417) 358-4700